

Decision No. 72681 Application Filed No. 49057 (Filed December 28, 1966)

Warren P. Maraden and Thomas Jackson for applicant.

N.R. Johnson, for the Commission staff.

### OPINION

By this application, San Francisco Bay Area Rapid Transit District requests the Commission to amend the Commission's General Order 95, "Rules for Overhead Line Construction," in such manner as will permit third rail construction and operation of its transit system.

The BART system prospectively comprises approximately 75 miles of double-track transit lines, of which 21 miles would be in tunnels, underwater tubes or completely enclosed structures, 26 miles would be on elevated structures, 10 miles would be at grade in highway median strips and 18 miles would be on private rights of way. It proposes to supply motive power from third rails, using direct-current electricity of approximately 1,000 volts potential.

Rule 79.1-A of the General Order No. 95 provides that:

"Third rail construction or reconstruction shall not be permitted in or through cities, towns or urban territory, except for local rapid transit lines principally located in subways or on elevated structures."

Such rule, in force since 1929, effectively prohibits BART's proposed third rail construction for at least 28 miles of its prospective system.

Third-rail railroad operation in California, at one time used on several hundred miles of line within the State, came to an end in 1958 when the last segment of third-rail operation (over the San Francisco-Oakland Bay Bridge) was terminated and the rails removed.

From the broad viewpoint of public safety, the elimination of third rails removed not only potential but actually experienced dangers, its being of record that both railroad employees and members of the general public had sustained injuries because of the presence of electrified third rails. The dangers and the injuries stemmed most commonly from two causes; namely, exposure of the third rail and inadequate fencing of rights-of way. Because of irregular roadbeds or swaying cars, the collector shoe would, on occasion, damage or rip away sections of the covering used to prevent unintentional contact with the third rail. Because of lack of adequate maintenance or because of damage caused by trespassers, portions of fences were in many instances completely missing and in

others gaps occurred which allowed ready access to the rights-of-way, particularly by children. A combination of these two causes could, and did in at least one instance, contribute to the electrocution of a person not aware of the perils involved.

"Safety" is a relative matter. For example, the danger of falling from an elevated insulated structure may be even greater than contact with the third rail on such a structure. TO the untrained or unwary person, trespass in tunnels or subways may carry greater perils than the protected third rails therein. It was the recognition of the relative seriousness of these hazards that led this Commission to adopt the "exception" noted in Rule 79.1-A hereinabove quoted.

The first portion of Rule 79.1-B states:

Third rail construction or reconstruction shall not be permitted unless the rights of way, easement or other property upon which same is located is entirely fenced."

Rule 79.2 requires the protection (partial enclosure) of the third rail in order to lessen the possibilities to accidental contact by workmen, while 79.3 basically requires grade separations, or suitable guards, in order to prevent access to portions of the right-of way in which third rails are located.

These four rules cover the basic principles of third rail construction.

BART's proposed construction, recognizing the principles set forth above will be grade-separated and fenced throughout, when located at ground level, and the third rail will be suitably protected.

Under temporary authority to deviate from existing rules, BART constructed a 4-½ double test track (for experimental purposes) in 1965. Such test track and its third rail usage has been carefully inspected by engineers of the Commission, who report, as built, operations do not adversely affect public safety. Further maintenance and regular and frequent inspections, so as to assure that no deterioration of plant (and hence public safety) will occur, however, is their primary concern after viewing the test installation and they recommend that a requirement for frequent inspections be included in any amendment of the existing third rail rules.

Having well in mind the many problems of urban and suburban passengers traffic handling and the present trend to return to mass rapid transit surface and subsurface systems, and being cognizant of the improvements and advancements in this state of the art which have occurred since the third-rail rules were first promulgated, the Commission is of the opinion that such rules may

appropriately be modified to permit construction of third-rail systems while at the same time reinforcing the basic principles of the rules as they are adapted to meet modern-day transportation needs. Fortunately, no economic burden for reconstruction of old systems to bring them up to the new standard will be involved, since any third rail system to be used at this time will be wholly new.

In view of the evidence and the foregoing discussion of certain of its more important aspects, the Commission concludes that the several rules of General Order No. 95 pertaining to third rails should be amended, as set forth in the following order.

## ORDER

Rule 79 of General Order is hereby amended to read as follows:

### "79 Third Rails

#### 79.1 General Provisions

Third rail construction or reconstruction shall be permitted only for rapid transit passenger lines located in subways, on elevated structures or within completely fenced rights-of-way, or a combination thereof.

In no event shall the third rail railroad cross at grade any other railroad, or public way, road, street, thoroughfare or highway, whether for use by pedestrians or vehicles.

Third rail construction shall be designed, installed and maintained in such manner as will secure safety to patrons and employees of the rapid transit line and to the public in general.

#### 79.2 Protective Guards and Coverings

Every third rail whether carried in subways, on elevated structures or on completely fenced rights-of-way, shall be protected by suitable guards and coverings made of insulating, impact resistant material and of such form as will present a minimum of third rail exposure.

#### 79.3 Location

Third rails, whether in subways, on elevated structures or in fenced rights-of-way shall be located to the side of the running rail farthest from station or passenger loading platforms.

#### 79.4 Fencing

##### A) At Ground Level

Third rail construction or reconstruction shall not be permitted at ground level unless the rights-of-way, easement or other property upon which the same is located is entirely fenced. Fence construction shall be designed, installed and maintained in such manner as to deny access

over, under or through the fencing to all but authorized persons.

B) Material and Height

Fencing material shall be of galvanized steel, woven mesh or links (commonly known as chain-link or cyclone fencing), extending from ground level to a minimum height of seven feet. Above said 7 foot height, there shall be installed an inclined extension of not less than 12 inches, to which shall be attached no fewer than three strands of barbed wire, with said extension being inclined 45° away from the fenced facilities wherever possible.

C) Barrier Protection of Fencing

Wherever the rights-of-way and its fencing are adjacent to thoroughfares or highways (such as in, but not limited to, highway median strips) suitable barriers shall be at all times present between the fencing and the thoroughfare or highway in order to prevent vehicular contact with or damage to the fencing.

D) Gates

Gates for access to the fenced rights-of-way shall be provided for the entrance of emergency vehicles and equipment at approximately one-half mile intervals along the rights-of-way, said gates to be of a design and maintained in a manner compatible with the fencing specified in Rule 79.4-A and Rule 79.4-B.

79.5 Warning Signs

At every gate, at each station or passenger loading platform, and at intervals of not more than 500 feet along each fence enclosing the rights-of-way, a sign or signs bearing the words "Danger", "Electric Third Rail" and "Keep Away" in letters at least 3 inches in height, shall be installed. The sign or signs may carry other information relative to the hazard present, but these three items shall be in type of larger size than the type of the additional items.

79.6 Inspections

At regular intervals not exceeding a calendar month, the transit line shall make a thorough inspection of all of the items pertaining to third rail operation set forth in the several foregoing sections of Rule 79. Records of such inspections, setting forth in detail any failures or discrepancies found and steps taken to correct them, shall be kept for periods of five years and a yearly summary thereof shall be forwarded to the Commission by not later than February 1 of each year. This requirement is in consonance with and additional to the requirements of General Order No. 66-B or subsequent amendments thereof. Such records and summary reports shall not be open to inspection by the public except upon specific order of the Commission.

The effective date of this order shall be twenty days after the date hereof.

Dated at San Francisco, California, this 27<sup>th</sup> day of June 1967.

Strikeout and underline added May 13<sup>th</sup>, 2002 by Raymond George Fugere.

## **Original Version**

### Rule 79

#### 79 Third Rails

##### 79.1 Territory

###### A Cities, Towns, ETC

Third rail construction or reconstruction shall not be permitted in or through cities, towns or urban territory, except for local rapid transit lines principally located in subways or on elevated structures.

###### B Along Fenced Right-of-Way

Third rail construction or reconstruction shall not be permitted unless the rights of way, easement or other property upon which same is located is entirely fenced. At every opening in such fence cattle guards or suitable fence gates must be used and a sign installed near such opening as provided in Rule 79.4.

##### 79.2 Protection

Third rail construction or reconstruction shall not be permitted unless the third rail is protected by suitable guards made of wood or other suitable material. In lieu of such protecting on spurs and loading tracks, disconnecting switches may be used, which shall be locked open when cars are not being switched.

### 79.3 Grade Crossing

#### A Highways

Third railroads shall not cross a public highway at grade unless suitable wing fences are constructed dividing said highway from the private right-of-way or fenced portion of highway or other property upon which said third rail railroad is located and unless all portions of said third rail are excluded from the portions of the highway between said wing fences, suitable signs being installed on either side of the highway as provided in Rule 79.4.

#### B Fenced Railroad Right of Way

Where third rail railroads cross railroads located on fenced rights-of-way, wing fences and cattle guards need not be installed. NO portion of the third rail shall be constructed or reconstructed within 10 feet of the nearest rail of the railroad crossed.

#### C Railroad Rights-of-Way Not Fenced

Where third rail railroads cross railroads not located on fenced rights-of-way, wing fences and cattle guards must be installed on both sides of the crossing at least 10 feet from the nearest rail of the railroad crossed. No portion of the third rail shall extend beyond the wing fences.

### 79.4 Warning Signs

At every cattle guard, gate or other opening in the fence surrounding the third rail, a sign bearing the words, "Danger," "Electric Third Rail" and "Keep Away," in letters at least three inches in height, shall be installed. The sign may carry other information relative to the hazard present, but these three items shall be in type of larger size than the type of the additional items



**Strikeout and Underline Version**  
Rule 79

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~~Third rail construction or reconstruction shall not be permitted unless the rights of way, easement or other property upon which same is located is entirely fenced. At every opening in such fence cattle guards or suitable fence gates must be used and a sign installed near such opening as provided in Rule 79.4.~~

In no event shall the third rail railroad cross at grade any other railroad, or public way, road, street, thoroughfare or highway, whether for use by pedestrians or vehicles.

Third rail construction shall be designed, installed and maintained in such manner as will secure safety to patrons and employees of the rapid transit line and to the public in general.

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Every third rail whether carried in subways, on elevated structures or on completely fenced rights-of-way, shall be protected by suitable guards and coverings made of insulating, impact resistant material and of such form as will present a minimum of third rail exposure.

### 79.3 Location Grade Crossing

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~~Third railroads shall not cross a public highway at grade unless suitable wing fences are constructed dividing said highway from the private right-of-way or fenced portion of highway or other property upon which said third rail railroad is located and unless all portions of said third rail are excluded from the portions of the highway between said wing fences, suitable signs being installed on either side of the highway as provided in Rule 79.4.~~

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Third rails, whether in subways, on elevated structures or in fenced rights-of-way shall be located to the side of the running rail farthest from station or passenger loading platforms.

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Third rail construction or reconstruction shall not be permitted at ground level unless the rights-of-way, easement or other property upon which the same is located is entirely fenced. Fence construction shall be designed, installed and maintained in such manner as to deny access over, under or through the fencing to all but authorized persons.

### B) Material and Height

Fencing material shall be of galvanized steel, woven mesh or links (commonly known as chain-link or cyclone fencing), extending from ground level to a minimum height of seven feet. Above said 7 foot height, there shall be installed an inclined extension of not less than 12 inches, to which shall be attached no fewer than three strands of barbed wire, with said extension being inclined 45° away from the fenced facilities wherever possible.

### C) Barrier Protection of Fencing

Wherever the rights-of-way and its fencing are adjacent to thoroughfares or highways (such as in, but not limited to, highway median strips) suitable barriers shall be at all times present between the fencing and the thoroughfare or highway in order to prevent vehicular contact with or damage to the fencing.

### D) Gates

Gates for access to the fenced rights-of-way shall be provided for the entrance of emergency vehicles and equipment at approximately one-half mile intervals along the rights-of-way, said gates to be of a design and maintained in a manner compatible with the fencing specified in Rule 79.4-A and Rule 79.4-B.

#### 79.5 ~~79.4~~ Warning Signs

At every ~~cattle guard~~, gate, at each station or ~~other opening in the fence surrounding the third rail~~ passenger loading platform, and at intervals of not more than 500 feet along each fence enclosing the rights-of-way, a sign or signs bearing the words "Danger", "Electric Third Rail" and "Keep Away" in letters at least 3 inches in height, shall be installed. The sign or signs may carry other information relative to the hazard present, but these three items shall be in type of larger size than the type of the additional items.

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## Final Version

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